

System Specification

Power Up/Down IPT, Thor DP1

Checkout and Launch Control System (CLCS)

84K00302-017

Power Up/Down Integrated Product Team (IPT)

Assessment

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Power Up/Down IPT

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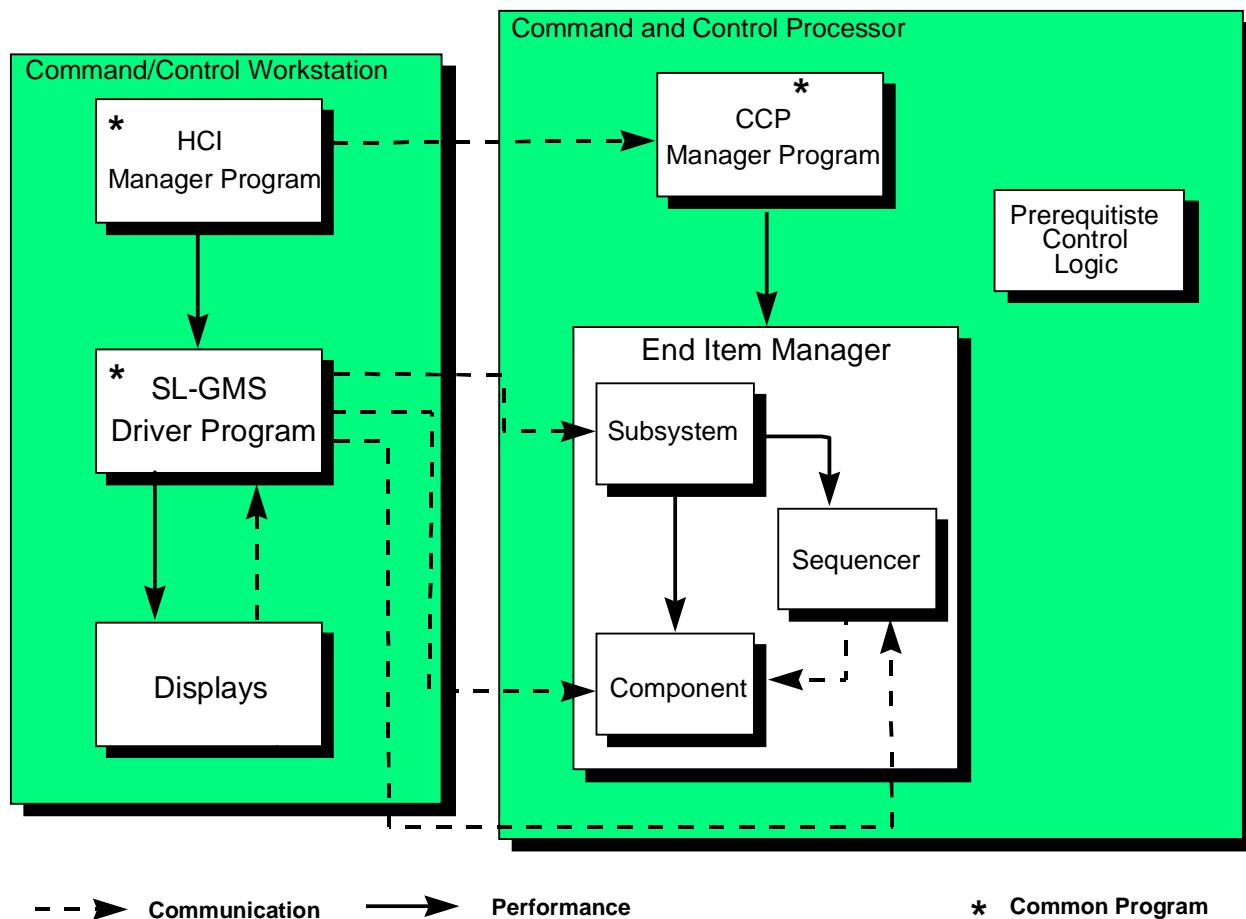
1. Introduction

1.1 Power Up/Down IPT Overview

This Integrated Product Team (IPT) is responsible for the definition, design, and development of the Real-Time Control Application software suite to support the automated power up/down of the Space Shuttle. The suite includes the auto power up/down sequence which is required by the Test Project Engineer (TPE), and the supporting subsystem software for the: Data Processing System (DPS), Environmental Control and Life Support System (ECLSS), Electrical Power and Distribution System (EPDC), Instrumentation System (INST) and test set master function (MSTR). The Applications suite not only includes power up/down sequence functionality, but the components required by these systems to monitor GSE and Flight Hardware when that hardware is active. The active monitor function is referred to as "Baby-sit". Baby-sit is a Space Shuttle Vehicle capability that allows Shuttle checkout and test.

1.2 Power Up/Down IPT Concept

The Power Up/Down CSCI will follow the CLCS Real Time Control Application Software architecture standard. The software is distributed between a Human/Computer Interface (HCI) Workstation and a Command and Control Processor (CCP). This distribution allows for processor loading and functionality to be controlled to enhance performance and maintainability. The following figure provides an illustration of the architecture.



1.3 Power Up/Down IPT Specification

1.3.1 Statement of Work

The completion of this IPT's software development will be in the post-Thor time-frame (scheduled completion is Titan). The following Highlights and Statement of Work apply only to those items which will be worked for Thor.

- Generate the Power Up/Down and “Baby-sit” support section of the Functional Requirements Documents for the following Applications:
 - Integrated Operations (does not complete all Integrated Operations requirements)
 - DPS (does not complete all DPS requirements)
 - ECLSS (does not complete all ECLSS requirements)
 - EPDC (does not complete all EPDC requirements)
 - INS (does not complete all INS requirements)
 - MASTER (does not complete all MASTER requirements)
- Begin to populate the Common Application Support Functional Requirements Document with multiply referenced requirements (locate requirement once in a standard repository).
- Begin design of power Up/Down and Baby-sit Real-Time Control application software
 - Begin design/development of Auto Power Up/Down Displays
 - Begin End Item Components/Managers (EIMs/EICs) design

1.3.2 Requirements

Detailed Application Software requirements will be documented in the Power Up/Down Functional Requirements Document. Requirements will be gathered from Shuttle test engineering during Thor. Requirements are the Thor deliverable for the Power Up/Down IPT.

1.4 Power Up/Down IPT Hardware Diagram

Not Applicable.

1.5 Power Up/Down IPT Deliverables

Deliverable	R&D Document	Code	API Manual	Users Guide
Common Applications support	FRD (partial)	N/A	N/A	N/A
INTG OPS - Power Up/Down Sequence	FRD (partial)	N/A	N/A	N/A
DPS - Vehicle Support	FRD (partial)	N/A	N/A	N/A
ECLSS - GSE support	FRD (partial)	N/A	N/A	N/A
ECLSS - Vehicle Support	FRD (partial)	N/A	N/A	N/A
EPDC - GSE support	FRD (partial)	N/A	N/A	N/A
EPDC - Vehicle Support	FRD (partial)	N/A	N/A	N/A
INST - Vehicle support	FRD (partial)	N/A	N/A	N/A
Master - Power Support	FRD (partial)	N/A	N/A	N/A

1.6 Power Up/Down IPT Assessment Summary

This section contains the summary of the costs and labor involved in implementing the capability. It is broken into three sections. The first is a summary of the individual CSCI labor assessments. The second is a summary of hardware costs. The third is a summary of procurement activities needed.

1.6.1 Labor Assessments

The total Labor Costs required to provide the requirements are summarized in the following table;

No.	CSCI Name	Thor	Changes covered in
1	Common Application Support	TBD	
2	Integrated Operations - Power Up/Down Sequence	5	
3	DPS - Vehicle support	6	
4	EPDC - GSE support - Vehicle support	7	
5	ECLSS - GSE support - Vehicle support	8	
6	INST - Vehicle support	3	
7	Master - Power support	2	
	TOTAL	31	

1.6.2 Hardware Costs

None.

1.6.3 Power Up/Down IPT Procurement

None.

1.7 Power Up/Down IPT Schedule & Dependencies

1.7.1 Schedule

Task Name	Start	Finish
Thor Assessment Kickoff	7/25/97	10/03/97
Concept Panel Internal Review	N/A	10/28/97
Concept Panel	N/A	10/30/97
Thor Development		
Requirement Review Panel	N/A	3/11/97
Thor Development Complete		3/27/97

1.7.2 Dependencies

No.	Dependency Area	Dependency	Need Date
1		Requirements Capture Tool	11/3/97

1.8 Power Up/Down IPT Simulation Requirements

There are no Thor Simulation Requirements for the delivery of the Power Up/Down Functional Requirements. The existing Shuttle Ground Operations Simulation (SGOS) math models will be used for validation and test which will take place after Thor.

1.9 Power Up/Down IPT Integration and System Test

Not Applicable.

1.10 Power Up/Down IPT Training Requirements

1.10.1 Training Needed

- Requirements capture tool
- Control Shell 6.0 Beta

1.10.2 Training to be provided

None.

1.11 Power Up/Down IPT Facilities Requirements

None.

1.12 Travel Requirements

None.

1.13 Power Up/Down IPT Action Items/Resolution

None.

2. CSCI Assessments

2.1 Common Application Support CSCI Assessment

The Common Application Support CSCI is a repository that stores common components used by multiple Application CSCIs. Multiply referenced requirements will be analyzed as candidates for inclusion into the Common Application Support repository. The labor required will depend on the number of multiply referenced requirements and the use of the requirements capture tool.

CSCI Assessment

CSCI Name	CSCI Labor (LM)	% of CSCI
Common Application Support	TBD	TBD

Documentation

Document Type	New/Update	Number of Pages
Functional Requirements Document	New	TBD

Assumptions

None.

Open Issues

None.

2.2 Integrated Operations CSCI Assessment

The Integrated Operations CSCI provides the abilities required by Test Project Engineering personnel to perform the Power Up/Down sequence. Requirements will be generated for the applicable sections of the Functional Requirements Document.

CSCI Assessment

CSCI Name	CSCI Labor (LM)	% of CSCI
Integrated Operations	5	TBD

Documentation

Document Type	New/Update	Number of Pages
Functional Requirements Document	New	TBD

Assumptions

None.

Open Issues

None.

2.3 DPS CSCI Assessment

The DPS CSCI provides the abilities required by DPS personnel to perform vehicle support. Requirements will be generated for the applicable sections of the Functional Requirements Document.

CSCI Assessment

CSCI Name	CSCI Labor (LM)	% of CSCI
DPS	6	TBD

Documentation

Document Type	New/Update	Number of Pages
Functional Requirements Document	New	TBD

Assumptions

None.

Open Issues

None.

2.4 ECLSS CSCI Assessment

The ECLSS CSCI provides the abilities required by ECLSS personnel to perform GSE and vehicle support. Requirements will be generated for the applicable sections of the Functional Requirements Document.

CSCI Assessment

CSCI Name	CSCI Labor (LM)	% of CSCI
ECLSS	8	TBD

Documentation

Document Type	New/Update	Number of Pages
Functional Requirements Document	New	TBD

Assumptions

None.

Open Issues

None.

2.5 EPDC CSCI Assessment

The EPDC CSCI provides the abilities required by EPDC personnel to perform GSE and vehicle support. Requirements will be generated for the applicable sections of the Functional Requirements Document.

CSCI Assessment

CSCI Name	CSCI Labor (LM)	% of CSCI
EPDC	7	TBD

Documentation

Document Type	New/Update	Number of Pages
Functional Requirements Document	New	TBD

Assumptions

None.

Open Issues

None.

2.6 INST CSCI Assessment

The INST CSCI provides the abilities required by INST personnel to perform vehicle support. Requirements will be generated for the applicable sections of the Functional Requirements Document.

CSCI Assessment

CSCI Name	CSCI Labor (LM)	% of CSCI
INST	3	TBD

Documentation

Document Type	New/Update	Number of Pages
Functional Requirements Document	New	TBD

Assumptions

None.

Open Issues

None.

2.7 MSTR CSCI Assessment

The MSTR CSCI provides the abilities required by MSTR personnel to perform power support. Requirements will be generated for the applicable sections of the Functional Requirements Document.

CSCI Assessment

CSCI Name	CSCI Labor (LM)	% of CSCI
MSTR	2	TBD

Documentation

Document Type	New/Update	Number of Pages
Functional Requirements Document	New	TBD

Assumptions

None.

Open Issues

None.

3. HWCI Assessments

None.

4. COTS Products Dependencies

4.1 SW Products Dependency List

- Requirements capture tool
- SL-GMS (licenses already procured)
- Control Shell 6.0 Beta Release (licenses already procured) required 1/16/98
- CORBA COTS product for inter-process communications (vendors under evaluation)

4.2 HW Products Dependency List

None.